

MSI-ACL Injury Prevention Program: Coaches Handbook for PEP-Plus



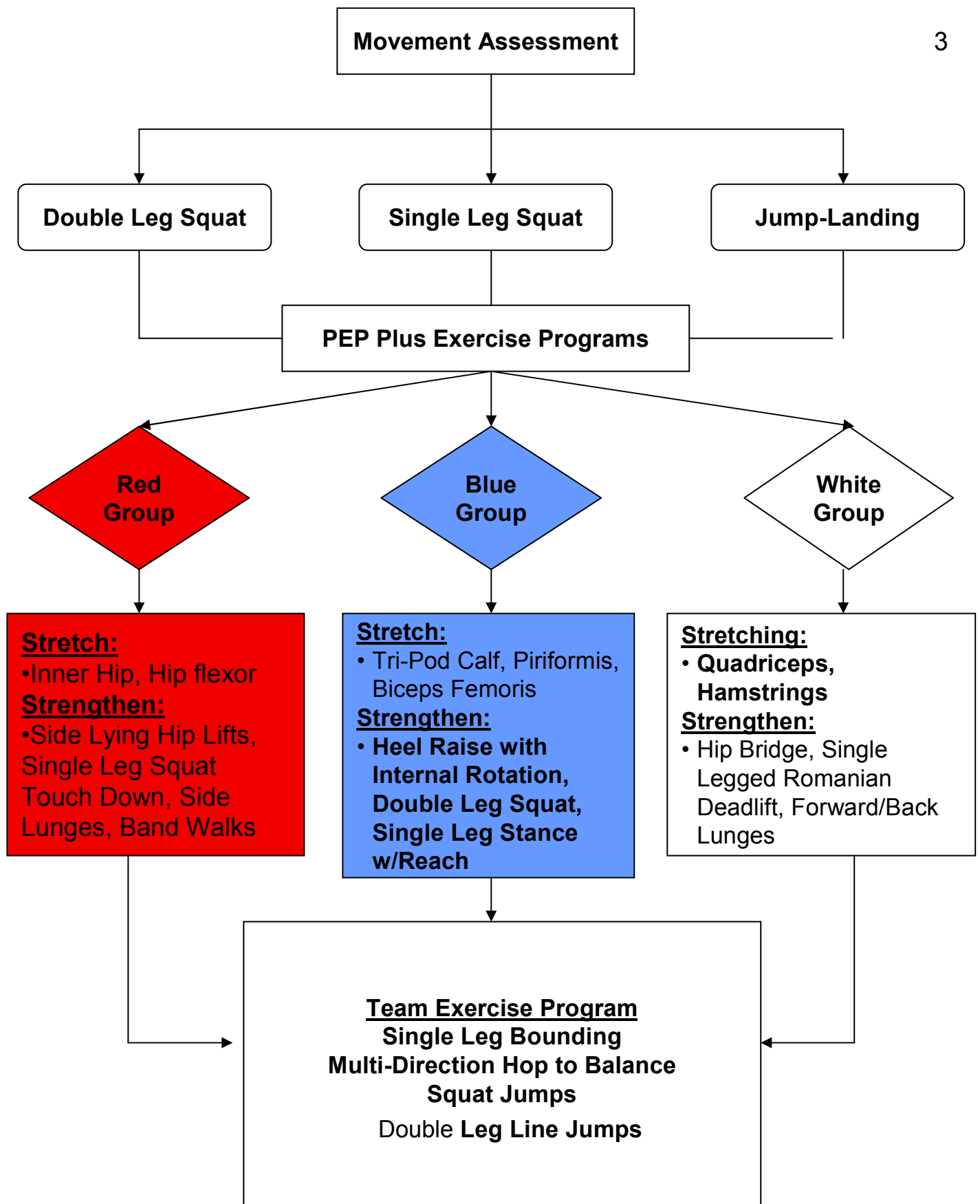
A collaborative partnership between
Montgomery County Soccer Leagues and the
Injury Prevention Research Laboratory at the
Uniformed Services University, Bethesda

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Overview

- ◆ The MSI-NCSL ACL injury prevention program is designed to prevent ACL & other leg injuries while improving performance
- ◆ The exercises in the MSI-NCSL ACL injury prevention program focus on: 1) landing “softly” (bending knees, hips, & trunk), 2) maintaining good body alignment (knees over toes, toes straight ahead, & trunk over hips), 3) improving core stability, 4) correcting muscle imbalances, and 5) improving dynamic balance.
 - There is evidence to indicate that similar exercise programs have reduced the risk of ACL and leg injuries.
- ◆ The MSI-NCSL ACL injury prevention program utilizes both tailored and team exercises. There are 3 different groups that will receive 5-6 tailored exercises based on an initial movement assessment. The PEP-Plus exercises should be performed in small groups prior to performing the team exercises. The team exercises consist of 4 separate exercises that should be performed by the entire team together.
- ◆ The MSI-NCSL ACL injury prevention program should be performed prior to practices / games as part of the team’s warm-up.
- ◆ The total time required to perform both the tailored and team exercises is 12-15 minutes.

PEP-Plus Exercise Program

- ◆ Based on a movement assessment the individuals will be placed into either the Red, Blue, or White Group
- ◆ The Red, Blue, & White Groups will perform 5-6 exercises that are unique to that group
- ◆ The tailored exercises should be conducted by placing the athletes in small groups (Red, Blue, White) and the exercises should be performed in the same order as presented in this booklet
- ◆ Once completing the individualized exercises the athletes should come back together as a team and perform the team exercise program
- ◆ Using correct technique when performing the tailored exercises is critical to success. There are common errors committed when performing each exercise. **The common errors are shown in pictures that have a red circle with line going through it at the bottom right hand corner of the page.** It is important to correct individuals who commit these errors and make sure that correct technique is being used.
- ◆ To further emphasize proper technique there are specific commands that should be given to individuals when performing the exercises. **The verbal commands that emphasize good technique are located in a red box at the bottom of the page describing the exercise.**

Red Group

- ◆ The following exercises are to be performed by those athletes placed in the Red Group
- ◆ Individuals in the Red Group will perform two types exercises aimed at:
 - Stretching the inner thigh muscles
 - Strengthening the outer hip muscles
- ◆ The goal of these exercises is to promote good knee alignment by strengthening and stretching those muscles that help to keep the knees centered over the toes

Inner Hip Stretch



Red Group

Inner Hip Stretch

◆ Goal

- Stretch the inner hip muscles (hip adductors)

◆ Starting Position

- Standing position with feet greater than hip width apart (like doing the splits). Both feet should be pointing straight ahead.
- Right inner hip: left foot should be slightly more forward than the right foot (staggered stance)
- Left inner hip: right foot should be slightly more forward than the left foot (staggered stance)

◆ Action

- Right inner hip: Lean towards your left leg until feeling a stretching in the right inner hip
- Left inner hip: Lean towards your right leg until feeling a stretch in the left inner hip

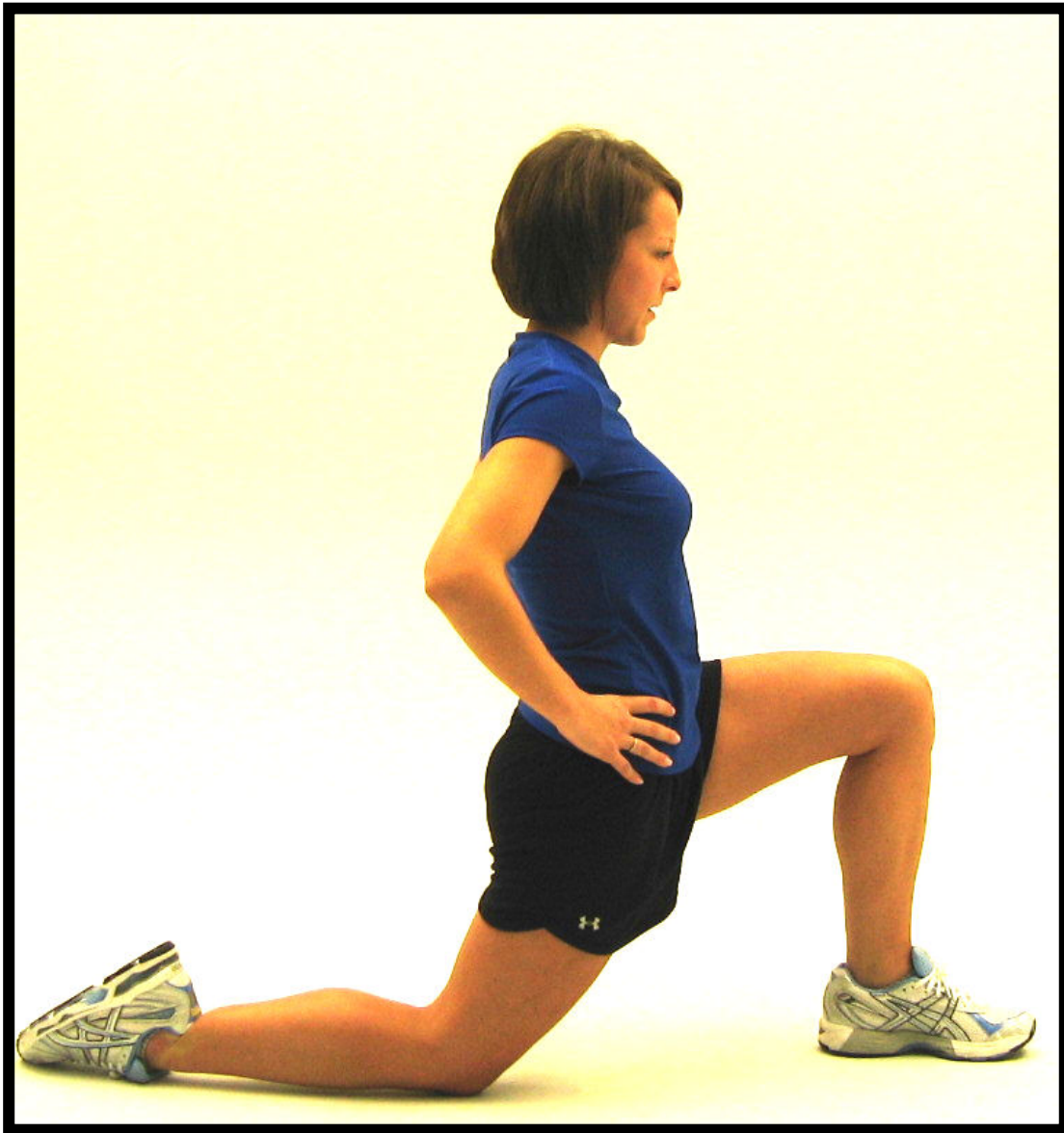
◆ Repetitions

- Hold each stretch for 30 seconds
- Perform 1 time for each leg

Important Items to Emphasize:

- **Keep the toes pointing straight ahead**

Hip Flexor/Quadriceps Stretch



Hip Flexor/Quadriceps Stretch

◆ Goal

- Stretch the front of the hip and thigh

◆ Starting Position

- Kneeling with one leg in front, keep front foot facing forward and knee in line with foot, place hands on pelvis

◆ Action

- Glide pelvis forward without arching the low back or leaning the upper body forward, front knee should be bent to about 90 degrees

◆ Repetitions

- Hold each stretch for 30 seconds
- Perform 1 time for each leg

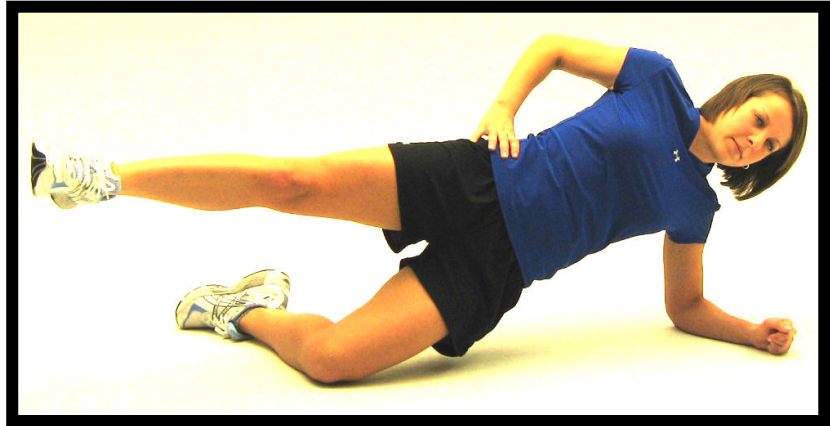
Important Items to Emphasize:

- **Do not arch low back or lean forward, stay upright**

Side Lying Hip Lift

11

Easy



Hard



Red Group

Side Lying Hip Lift

◆ Goal

- Strengthen the outer hip muscles (gluteus medius)

◆ Starting Position

- Easy: Side lying on elbow with bottom knee flexed
- Hard: Side lying on elbow with bottom leg straight

◆ Action

- Slowly lift the leg upwards while keeping toes pointed straight ahead. Keep leg in line with upper body.

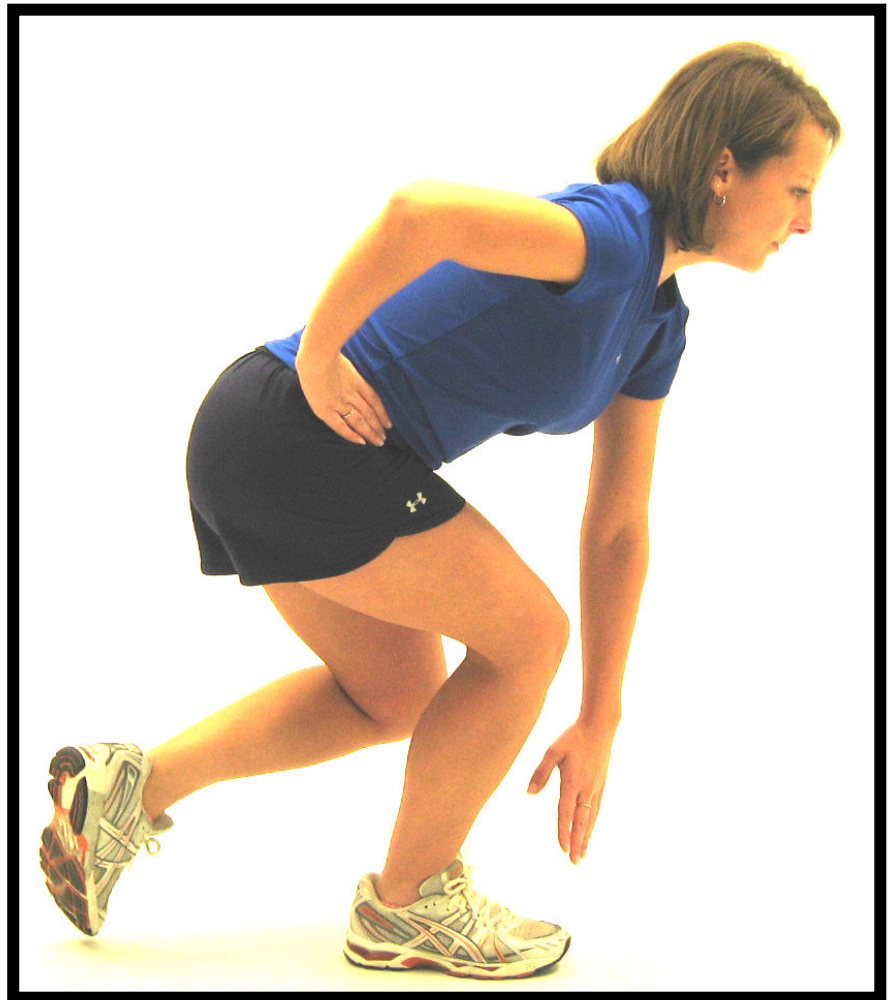
◆ Repetitions

- Perform 10 repetitions for each leg

Important Items to Emphasize:

- **Keep the toes pointing straight ahead**
- **Keep the lifting leg in line with body**
- **Keep the head & neck in line with body**

Single Leg Squat Touch Down



Red Group

Single Leg Squat Touch Down

◆ Goal

- Strengthen lower extremity muscles, improve balance, and coordination

◆ Starting Position

- Right Side- stand on right leg with right hand on the pelvis
- Left Side- stand on left leg with left hand on the pelvis

◆ Action

- Right Side- squat down bending at the knee AND hip and touch your right foot with you left hand
- Left Side- squat down bending at the knee AND hip and touch your left foot with you right hand

◆ Repetitions

- Perform 10 single leg squats on the left leg and 10 on the right leg

Important Items to Emphasize:

- **Keep the knee over the toe**
- **Bend at the knee AND hip**

Side Lunge



Red Group

Side Lunge

◆ Goal

- Strengthen lower extremity muscles

◆ Starting Position

- Feet shoulder width apart, hands placed on the pelvis, toes and knees pointing forward

◆ Action

- Right- step to the right squatting down on the right leg while keeping the left leg straight, be sure to bend at the knee, hip, and trunk. Keep the toes forward and the knee over the foot
- Left- step to the left squatting down on the left leg while keeping the right leg straight, be sure to bend at the knee, hip, and trunk. Keep the toes forward and the knee over the foot

◆ Repetitions

- Perform 10 lunges to the left and 10 to the right

Important Items to Emphasize:

- **Keep the toes forward**
- **Keep the knee over the toe**
- **Bend at the knee AND hip**

Band Walks



Red Group

Band Walks

◆ **Goal**

- Strengthen the outer hip muscles

◆ **Starting Position**

- Standing position with hands on hips
- Place tubing around the ankles
 - Placing tubing up towards the knees will decrease difficulty while placing tubing at the ankles will increase difficulty

◆ **Action**

- Side step left: Take 10 side steps to the left in a slow and controlled manner while keeping the toes pointed straight ahead
- Side step right: Take 10 side steps back to the right in a slow and controlled manner while keeping the toes pointed straight ahead

◆ **Repetitions**

- Perform 10 side steps left and 10 side steps right

Important Items to Emphasize:

- **Keep the toes pointing straight ahead**
- **Move in a straight line**

Blue Group

- ◆ The following exercises are to be performed by those athletes placed in the Blue Group
- ◆ Individuals in the Blue Group will perform two types of exercises aimed at:
 - Stretching muscles that pull the leg into external rotation
 - Strengthening muscles that rotate the leg back to neutral
- ◆ The goal of these exercises is to promote good lower leg alignment by strengthening and stretching those muscles that help to keep the toes pointing forward

Tri-Pod Calf Stretch



Blue Group

Tri-Pod Calf Stretch

◆ Goal

- Stretching the calf muscles

◆ Starting Position

- Bend forward and place hands on ground (bend at hips while keeping knees straight)
- Right Calf: Knee of right leg is fully extended while the left leg rests on the back of the right leg
- Left Calf: Knee of left leg is fully extended while the right leg rests on the back of the left leg

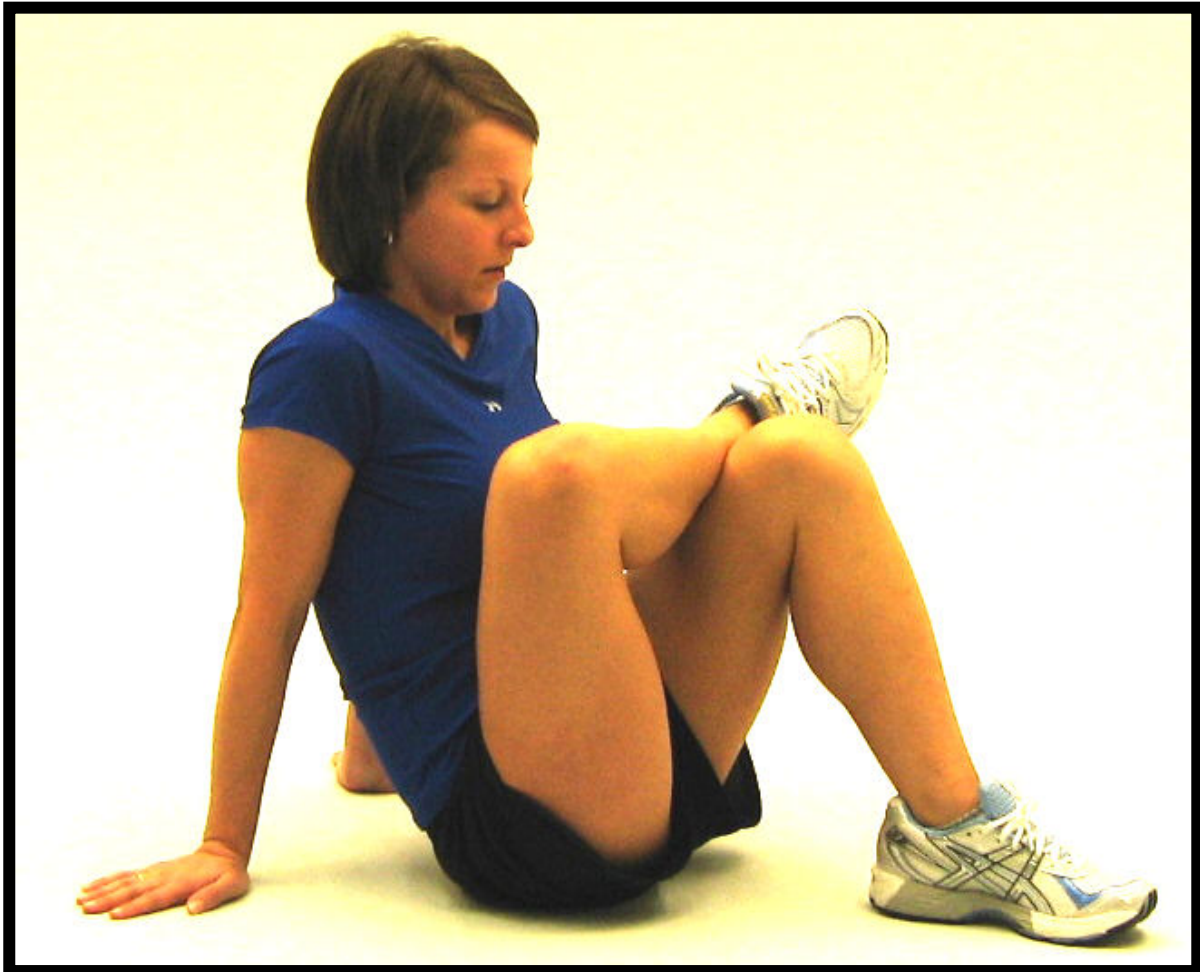
◆ Action

- Right Calf: Lower the heel of the right foot towards the floor until feeling a stretch in the right calf
- Left Calf: Lower the heel of the left foot towards the floor until feeling a stretch in the left calf

◆ Repetitions

- Hold each stretch for 30 seconds
- Perform 1 time for each leg

Seated Piriformis Stretch



Blue Group

Seated Piriformis Stretch

◆ **Goal**

- Stretching the piriformis muscle

◆ **Starting Position**

- Right leg- sit on the ground, bend left knee so the left foot is flat on the ground, cross the right leg over the left placing the right ankle on the left thigh
- Left leg- sit on the ground, bend right knee so the right foot is flat on the ground, cross the left leg over the right placing the left ankle on the right thigh

◆ **Action**

- Right leg-pull the left leg closer to the body and push the right knee away from the body to rotate the right hip
- Left leg-pull the right leg closer to the body and push the left knee away from the body to rotate the left hip

◆ **Repetitions**

- Hold each stretch for 30 seconds
- Perform 1 time for each leg

Biceps Femoris 90/90 Stretch



Blue Group

Biceps Femoris 90/90 Stretch

◆ Goal

- Stretch the lateral hamstring muscle (biceps femoris)

◆ Starting Position

- Right leg- lay flat on the ground, lift the right leg up and place the hands behind the right knee maintaining a 90 degree angle at the right hip
- Left leg- lay flat on the ground, lift the left leg up and place the hands behind the left knee maintaining a 90 degree angle at the left hip

◆ Action

- Right leg- extend the lower leg so your right knee is as straight as possible
- Left leg0 extend the lower leg so your left knee is as straight as possible

◆ Repetitions

- Hold each stretch for 30 seconds
- Perform 1 time for each leg

Heel Raise with Toe In



Blue Group

Heel Raise with Toe In

◆ Goal

- Strengthening the inner calf muscles

◆ Starting Position

- Right leg: Rotate toes of right foot inward by ~45-degrees and then stand on only the right leg (slightly lift left foot off ground)
- Left leg: Rotate toes of left foot inward by ~45-degrees and then stand on only the left leg (slightly lift the right foot off the ground)

◆ Action

- Right leg: Lift the right heel off the ground and move up onto the toes. Hold for 1 second and slowly lower the heel back to the ground.
- Left leg: Lift right heel off the ground and move up onto the toes. Hold for 1 second and slowly lower the heel back to the ground.

◆ Repetitions

- Perform 10 repetitions for each leg

Important Items to Emphasize:

- **Keep the toes rotated inward while keeping pelvis, hips, and shoulders pointing forward**

Double Legged Squats



Blue Group

Double Legged Squats

◆ **Goal**

- Strengthening of the lower extremity

◆ **Starting Position**

- Feet shoulder width apart, feet facing forward, knees over toes, hands on the pelvis

◆ **Action**

- Bend at the knees, hips, and trunk as if you were sitting in a chair, do not go past 90 degrees of knee bend, be sure to keep the feet facing forward and the knees in line with the feet

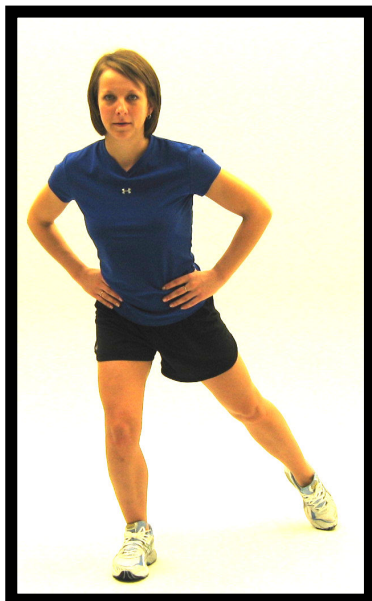
◆ **Repetitions**

- Perform double legged squats 10 times

Important Items to Emphasize:

- **Keep feet shoulder width apart and pointing forward**
- **Keep knees over toes**
- **Bend at hips and knees**

Single Leg Stance with Reach



Blue Group

Single Leg Stance with Reach

◆ Goal

- Improve balance and coordination

◆ Starting Position

- Right- stand on right leg with hands on the pelvis, have the knee and hip slightly bent
- Left- stand on left leg with hands on the pelvis, have the knee and hip slightly bent

◆ Action

- Right- reach out with left foot in the following directions: forward, forward and to the side, side, side and back, straight back; return to the center between each reach
- Left- reach out with right foot in the following directions: forward, forward and to the side, side, side and back, straight back; return to the center between each reach

◆ Repetitions

- Perform 5 reaches in each direction on both the left leg and right leg

Important Items to Emphasize:

- **Keep the toes pointing straight ahead**
- **Keep knee over toes, do not let it cave inward**

White Group

- ◆ The following exercises are to be performed by those athletes placed in the White Group
- ◆ Individuals in White Group will perform three separate exercises aimed at:
 - Strengthening the abdominal muscles
 - Stretching the hip rotator muscles
 - Strengthening the outer hip muscles
- ◆ The goal of these exercises is to promote core stability and soft landings through strengthening of key muscles

Quad Stretch



White Group

Quad Stretch

◆ Goal

- Stretch the front of the leg (quadriceps)

◆ Starting Position

- Right- stand on the left leg
- Left- stand on the right leg

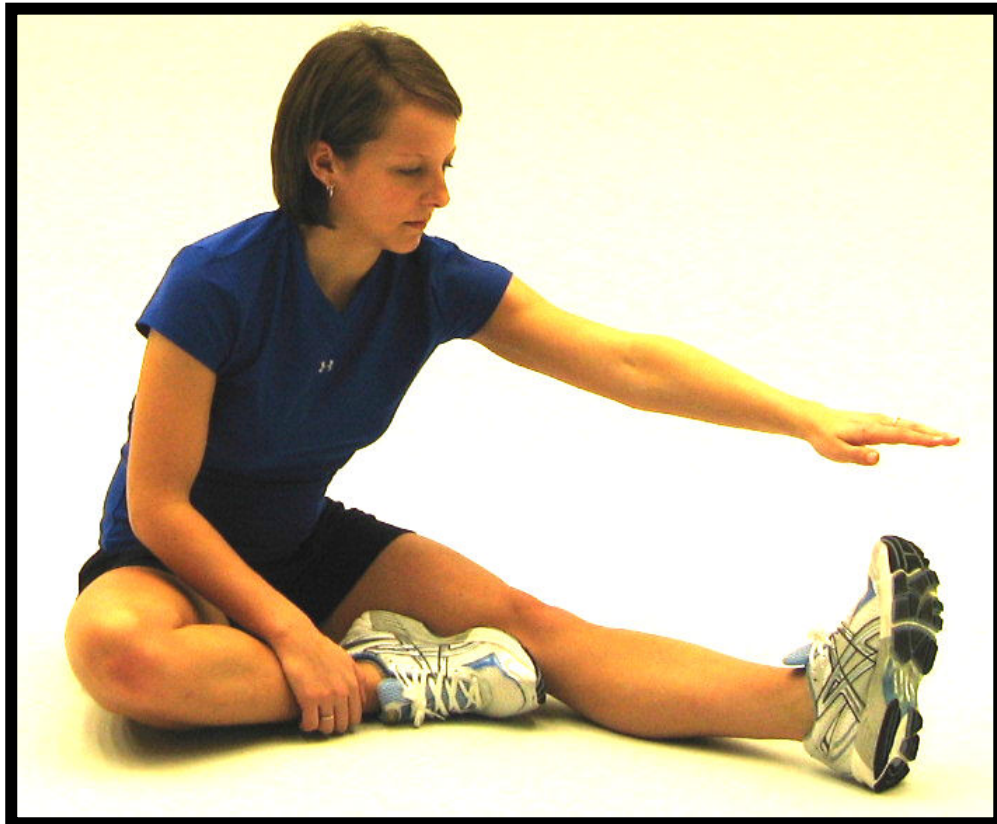
◆ Action

- Right- pull the right heel back to the right buttocks
- Left- pull the left heel back to the left buttocks

◆ Repetitions

- Hold each stretch for 30 seconds
- Perform 1 time for each leg

Hamstring Stretch



White Group

Hamstring Stretch

◆ Goal

- Stretch the back of the thigh (hamstrings)

◆ Starting Position

- Right- seated on the ground with the right leg straight in front and the left leg knee bent with the left foot against the inside of the right thigh
- Left- seated on the ground with the left leg straight in front and the right leg knee bent with the right foot against the inside of the left thigh

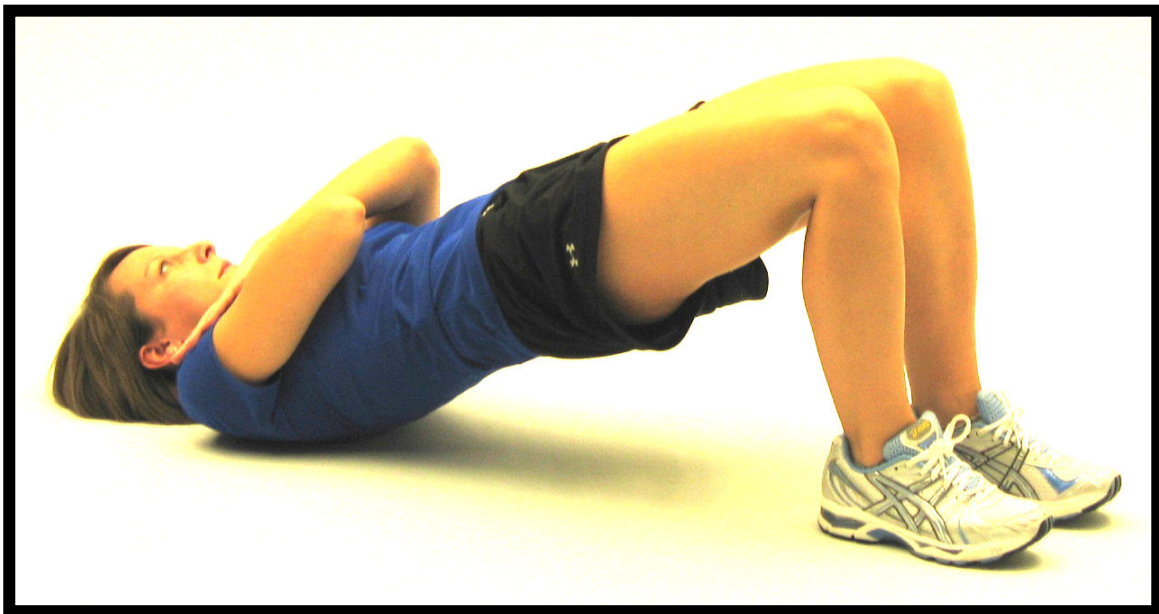
◆ Action

- Right- keeping a straight back, lean forward bring the chest towards the right foot
- Left- keeping a straight back, lean forward bring the check towards the left foot

◆ Repetitions

- Hold each stretch for 30 seconds
- Perform 1 time for each leg

Hip Bridge



White Group

Hip Bridge

◆ Goal

- Promotes “core” stability

◆ Starting Position

- Lay on the ground on your back with arms on the ground beside your body, knees bent and feet on the ground.

◆ Action

- Easy: Keep your arms beside your body on the ground while you slowly lift your hips off the ground until trunk, hips, and thighs create a straight line. Hold for 10 seconds.
- Medium: Cross your arms across your chest and then slowly lift your hips off the ground until trunk, hips, and thighs create a straight line. Hold for 10 seconds.
- Hard: Identical action as medium with an addition of alternate straightening each leg while keeping control of your body. Straighten each leg 5 times.

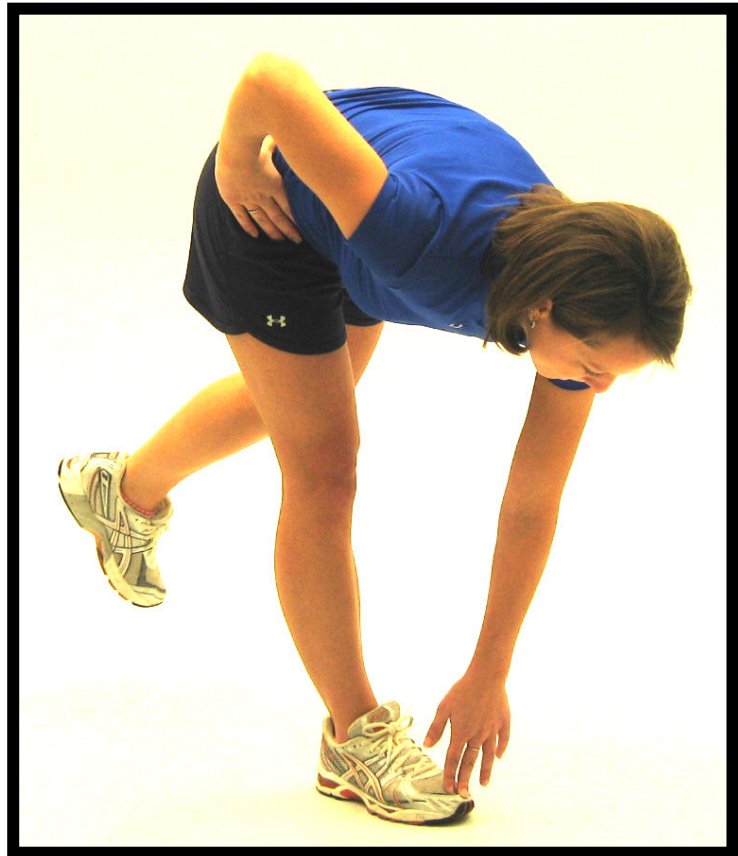
◆ Repetitions

- Perform 5 times holding in the up position for 5 seconds.

Important Items to Emphasize:

- **Keep trunk, hips, and thighs in a straight line**
- **Keep your pelvis/hips level (avoid tilting to one side)**

Single Leg Romanian Deadlift



White Group

Single Leg Romanian Deadlift

◆ Goal

- Strengthen the gluteus maximus and improve balance and coordination

◆ Starting Position

- Right- stand on the right foot with right hand on right pelvis, maintain about 10 degrees of knee bend
- Left- stand on the left foot with the left hand on the left pelvis, maintain about 10 degrees of knee bend

◆ Action

- Right- bend at the right hip lowering the body down trying to touch the right foot with the left hand, do not bend knee
- Left- bend at the left hip lowering the body down trying to touch the left foot with the right hand, do not bend knee

◆ Repetitions

- Perform 10 Single Leg Romanian Deadlifts on the left leg and the right leg

Important Items to Emphasize:

- **Keep the toes pointing straight ahead**
- **Keep the knee locked out at about 10 degrees of bend**

Forward/Backward Lunges



White Group

Forward/Backward Lunges

◆ Goal

- Strengthen lower extremity muscles while improving coordination

◆ Starting Position

- Right- stand with feet closer together and hands on pelvis
- Left- stand with feet close together and hands on pelvis

◆ Action

- Right- step forward with right leg, keep foot pointing forward, step far enough so you can lower yourself straight down keeping a 90 degree angle at both knees, do not arch the back, gently touch the left knee to the ground and return back to the starting position
- Left- step forward with left leg, keep foot pointing forward, step far enough so you can lower yourself straight down keeping a 90 degree angle at both knees, do not arch the back, gently touch the right knee to the ground and return back to the starting position

◆ Repetitions

- Perform 10 forward and backward lunges on each leg

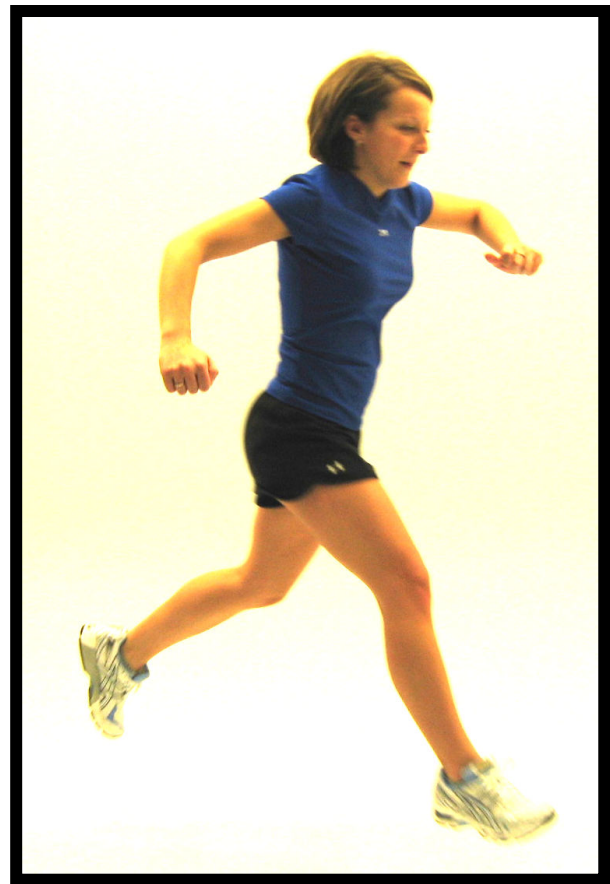
Important Items to Emphasize:

- **Keep the toes and knees pointing straight ahead**
- **Do not arch the low back**

Team Exercise Program

- ◆ There are 4 separate exercises to be performed as part of the team exercise program
- ◆ The team exercises should be performed in the same order as presented in this booklet: 1) Single Leg Bounding, 2) Multi-Direction Hop to Balance, 3) Squat Jumps, & 4) Single Legged Line Jumps
- ◆ Using correct technique when performing the generalized exercises is critical to success. There are common errors committed when performing each exercise. **The common errors are shown in pictures that have a red circle with line going through it at the bottom right hand corner of the page.** It is important to correct individuals who commit these errors and make sure that correct technique is being used.
- ◆ To further emphasize proper technique there are specific commands that should be given to individuals when performing the exercises. **The verbal commands that emphasize good technique are located in a red box at the bottom of the page describing the exercise.**

Single Leg Bounding



Single Leg Bounding

◆ Goal

- Increase strength of lower leg muscles, improve coordination of leg muscles, and increase dynamic balance

◆ Starting Position

- Stand on one leg with arms relaxed by the side

◆ Action

- Bound forward onto opposite leg repeated trying to go as far as you can on each bound, repeat the process as though you were running

◆ Repetitions

- Perform the single leg bounding for 10 yards
- Repeat this 2 times (down 10 yards and return to starting line)

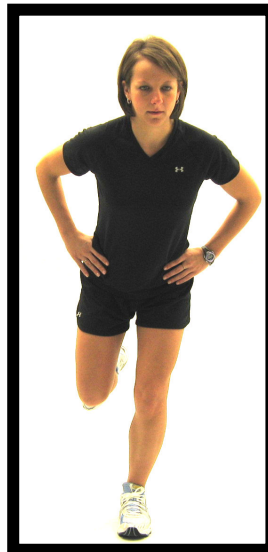
Important Items to Emphasize:

- **Keep the knees over the toes**
- **Keep the toes pointing straight ahead**
- **Keep the trunk centered over the hips**
- **Control the body throughout the motion**

Multi Direction Hops to Balance



Start



Forward Hop to Balance



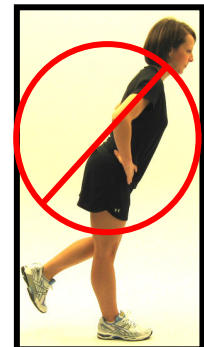
Side Hop to Balance



Twisting Hop to Balance



Keep Knees Over Toes



Avoid Straight Leg Landings

Multi Directional Hops to Balance⁴⁷

◆ Goal

- Improve ability to land “softly”, increase dynamic balance, and improve ability to maintain good alignment during dynamic tasks

◆ Starting Position

- Standing position with hands on hips

◆ Action

- Forward hop: hop forward and land on one leg and try to regain one legged balance as quickly as possible.
Alternate legs: right forward hop → Return to starting position → Left forward hop
- Side hop: hop to the side and land on one leg and try to regain one legged balance as quickly as possible.
Alternate legs: Right side hop → Return to starting position → Left side hop
- Twisting hop: lift the left leg and hop back and to the left ~135 degrees while pushing off with the back right foot. Achieve one legged balance as quickly as possible.
Alternate legs: Left twisting hop → Return to starting position → Right twisting hop

◆ Repetitions

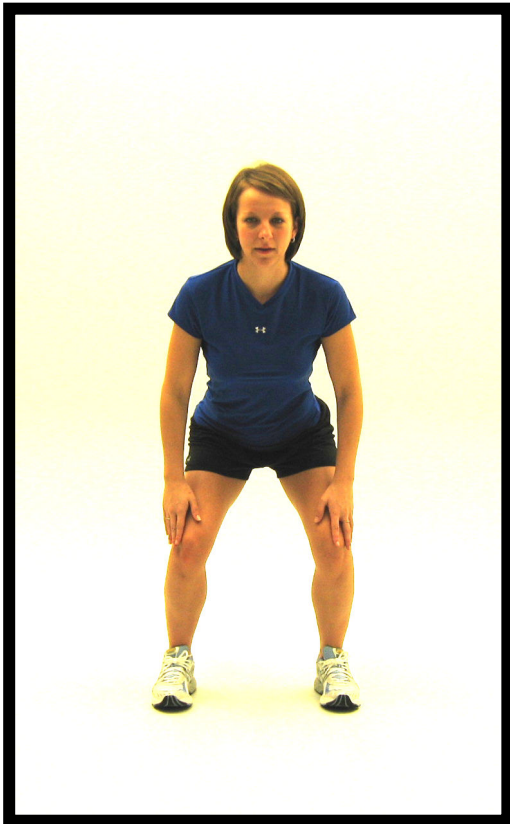
- Perform 5 repetitions for each leg in each direction

Important Items to Emphasize:

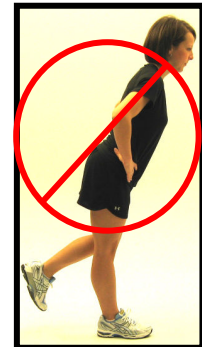
- **Get balanced as quickly as possible**
- **Land “softly” by bending the knees and hips**
- **Keep the knee over the toes and toes pointed straight ahead**
- **Don’t allow the feet or knees to come together when landing and gaining balance**



Squat Jumps



**Keep Knees
Over Toes**



**Avoid straight
leg landings**

Squat Jumps

◆ Goal

- Increase leg power and “soft” landings

◆ Starting Position

- Standing position with feet shoulder width apart and hands by side

◆ Action

- Flex the knees, hips, and trunk and jump upward for maximal vertical height. Land with a large amount of knee, hip, and trunk flexion and hold the landing for 3 seconds.
- After holding the landing then return to starting position and repeat the squat jump task.

◆ Repetitions

- Perform 10 repetitions

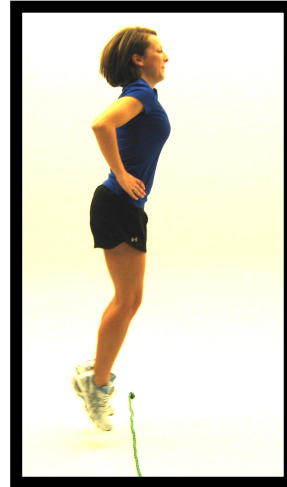
Important Items to Emphasize:

- Land “softly” by bending the knees and hips
- Land on your toes and bend your knees and hips as much as possible
- Keep the knees over the toes
- Keep the toes pointing straight ahead

Double *Legged Line Jumps*

50

**Forward-
Backward
Hops**



**Side to Side
Hops**



**Keep Knees
Over Toes**



**Avoid Straight
Leg Landings**

Double *Legged Line Jumps*

51

◆ Goal

- Increase speed, agility, and ability to change direction while performing “soft” landings and maintaining good leg alignment

◆ Starting Position

- Forward-Backward Hops: double leg standing with hands on hips with foot behind the line
- Side to Side Hops: double leg standing with hands on hips to left/right of the line

◆ Action

- Forward-Backwards Hops: perform a double leg hop and land in front of the line. Immediately after landing then hop backwards and land behind the line at the starting point.
- Side to Side Hops: perform a double leg hop in a lateral direction and land on the opposite side of the line. Immediately after landing then hop back to the starting point.

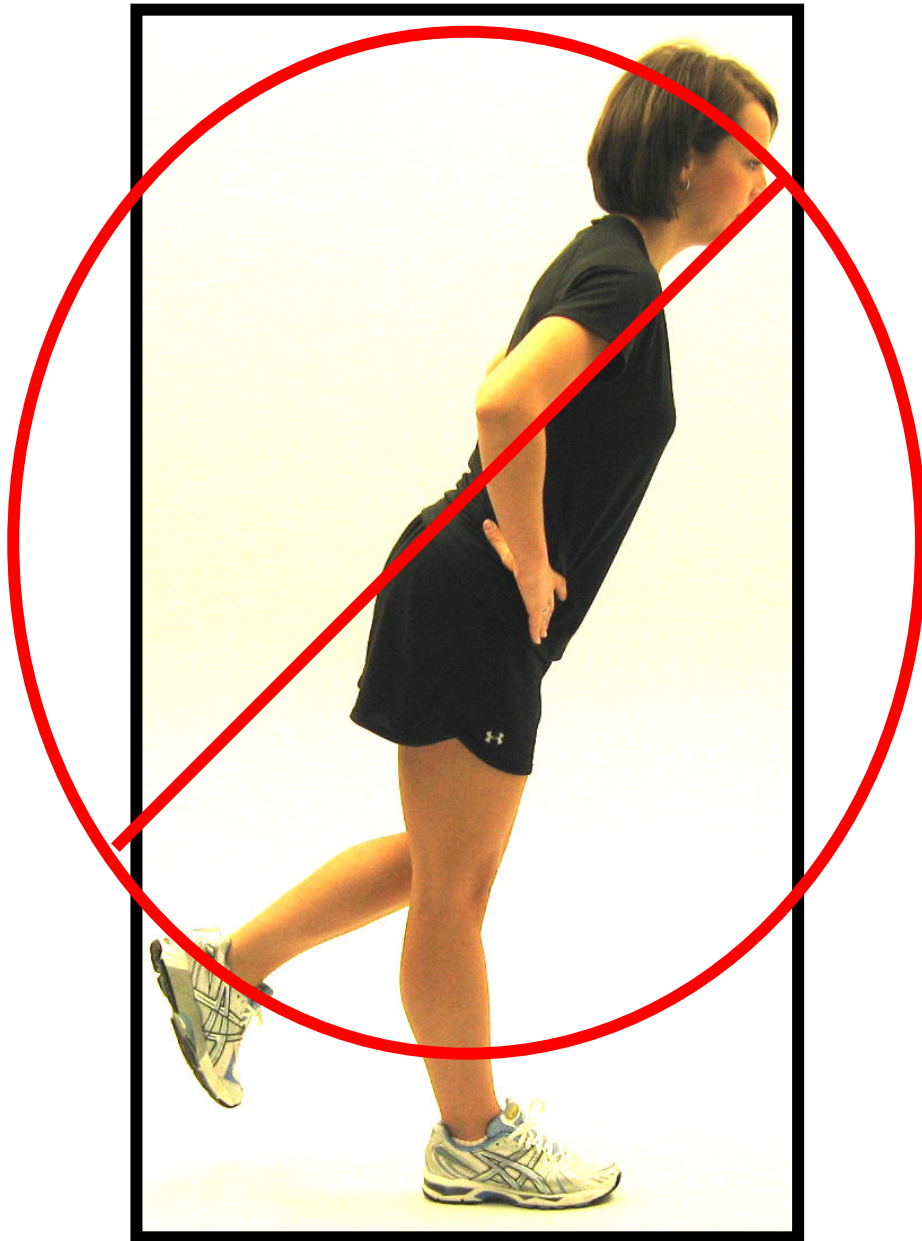
◆ Repetitions

- Perform 10 repetitions for each leg in each direction (forward-backward hops and side to side hops)
- A repetition is counted when hopping over and back of the line

Important Items to Emphasize:

- **Land “softly” by bending the knees and hips**
- **Keep the knee over the toes**
- **Keep the toes pointing straight ahead**
- **Move as quickly as possible**

Always Land “Softly” by Bending the Knees & Hips





Always Keep Knees Over Toes

